
ढुलाई प्रयोजनों के इस्तेमाल के लिए इस्पात
की तार रस्सियाँ — विशिष्टि

(चौथा पुनरीक्षण)

**Steel Wire Ropes for Haulage
Purposes — Specification**

(Fourth Revision)

ICS 73.100.40:77.140.65

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wire Ropes and Wire Products Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was originally published in 1963, revised in 1970, 1977 and in 2005. This standard is being revised again to incorporate the amendments issued and the suggestions received from time to time. Editorial changes under table 4 and have been incorporated.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STEEL WIRE ROPES FOR HAULAGE PURPOSES — SPECIFICATION

(*Fourth Revision*)

1 SCOPE

This standard covers the general requirements for steel wire ropes for haulage purposes in mines and elsewhere except for man-riding purposes. The following rope construction, types, rope grades, cores and range of sizes are included in this standard as identified by $\times$ mark:

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
1804 : 2004	Steel wire ropes — Fibre main cores — Specification (<i>fourth revision</i>)
1835 : 1976	Specification for round steel wire for ropes (<i>third revision</i>)
2363 : 1981	Glossary of terms relating to wire ropes (<i>first revision</i>)
6594 : 2018	Technical supply conditions for steel wire ropes and strands (<i>third revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2363 shall apply.

4 ROPE SIZE AND TOLERANCES

The size of the rope designated as nominal diameter shall be one of those given in Tables 1 to 4. The actual diameter of the rope as supplied shall be within $+4, -1$ percent of the nominal diameter.

5 MINIMUM BREAKING FORCE

Minimum breaking force of ropes shall be as given in Tables 1 to 4.

6 GENERAL REQUIREMENTS

6.0 The wire rope shall conform to IS 6594 and shall also meet the following requirements.

6.1 Core**6.1.1 Fibre Core**

Use of soft fibre (Jute) core according to IS 1804 is permitted.

6.1.2 Steel Core

Steel core shall be according to IS 6594.

Construction	Type	Rope Grade			Core		Size Range (Dia) mm	Ref to Table
		1570	1770	1960	Fibre	Steel		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6 $\times$ 7 (6-1)	Round Stand	$\times$	$\times$	$\times$	$\times$	$\times$	8-40	1
6 $\times$ 17S (8-8-1)		$\times$	$\times$	$\times$	$\times$	$\times$	13-40	2
6 $\times$ 19S (9-9-1)		$\times$	$\times$	$\times$	$\times$	$\times$	13-40	2
6 $\times$ V8 (7- Δ)	Flattened (triangular) Stand	$\times$	$\times$	$\times$	$\times$	$\times$	13-36	3
6 $\times$ V9 (8- Δ)		$\times$	$\times$	$\times$	$\times$	$\times$	13-36	3
6 $\times$ V22 (9/12- Δ)		$\times$	$\times$	$\times$	$\times$	$\times$	13-40	4
6 $\times$ V23 (10/12- Δ)		$\times$	$\times$	$\times$	$\times$	$\times$	13-40	4

6.2 Joints

6.2.1 The joints in wires shall be avoided as far as possible, except where they are necessitated by the length of the rope; those in the wires of the strand shall be distributed as widely apart as possible, and in no case shall more than one wire be jointed in any length of 10 m of strand.

6.2.2 The joints shall be either brazed or electrically welded. If joints are brazed they shall be properly scarfed, if welded, properly annealed. Tucked joints in wires during rope making may be used for wires of 0.5 mm diameter and smaller.

6.3 Lay

The lay of the rope shall be either ordinary lay or Lang's lay.

6.4 Mass

The approximate rope masses given in Tables 1 to 4 are for fully greased ropes. The ropes that are not lubricated may be lighter.

6.5 Preforming

All ropes shall be preformed unless otherwise agreed to between the purchaser and the manufacturer.

7 GALVANIZING

When required, galvanizing shall conform to Type B of IS 1835 unless specified otherwise by the purchaser.

8 SAMPLING PLAN

8.1 Lot

Steel wire rope of same size manufactured using the same set of strands and same type of core under identical condition of production, shall constitute a lot.

NOTE — Manufacturer shall provide evidence for the tractability of the individual rope lengths to the parent rope to establish that those represent the lot as defined above.

8.2 For ascertaining the conformity of a lot, the following sampling plan shall be made:

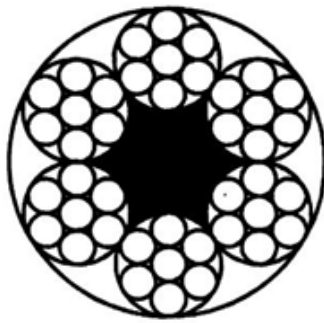
- a) *Dimensional checking* — 100 percent.
- b) *Breaking force test* — one sample from a lot.

9 MARKING

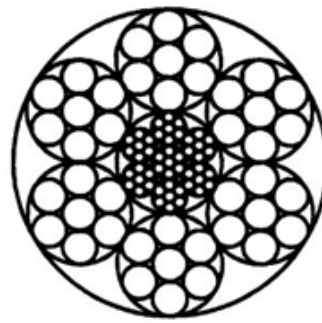
9.1 The size, construction, rope grade, lay, core, coating and length of wire rope, reel/coil number along with the order number of purchaser and any other marking which may be specified by the purchaser shall be legibly mentioned on a suitable tag securely attached, when wire ropes are supplied in coils. In case wire ropes are supplied in reels, the information may be stenciled on both sides of the reels or stenciled on one side of the reel and a suitable tag giving the same information may be attached on the other side of the reel.

9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.



FIBRE CORE (CF)



STEEL CORE (CWR)

Table 1 Breaking Force and Mass for 6 × 7 (6-1) Construction Ropes
(Clauses 4, 5 and 6.4)

Nominal Diameter mm	Approximate Mass, kg/100m		Minimum Breaking Force Corresponding to Rope Grade, kN					
			1570		1770		1960	
	Fibre Core (CF)	¹⁾ Steel Core (CWR)	Fibre Core (CF)	¹⁾ Steel Core (CWR)	Fibre Core (CF)	¹⁾ Steel Core (CWR)	Fibre Core (CF)	¹⁾ Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
8	22.9	25.2	33	36	38	41	42	45
9	28.9	31.8	42	46	48	51	53	57
10	35.7	39.3	52	56	59	64	65	70
11	43.2	47.6	63	68	71	77	79	85
12	51.5	56.6	75	81	85	91	94	101
13	60.4	66.4	88	95	99	107	110	119
14	70.1	77.0	102	110	115	124	128	138
16	91.5	101	134	144	151	163	167	180
18	116	127	169	183	191	206	211	228
19	129	142	188	203	212	229	235	254
20	143	157	209	225	235	254	260	281
22	173	190	252	273	285	307	315	340
24	206	226	300	324	339	366	375	405
25	223	246	326	352	367	397	407	440
26	242	266	353	381	397	429	440	475
28	280	308	409	442	461	498	510	551
32	366	403	534	577	602	650	667	720
36	463	509	676	730	762	823	844	911
40	572	629	834	901	941	1016	1042	1125

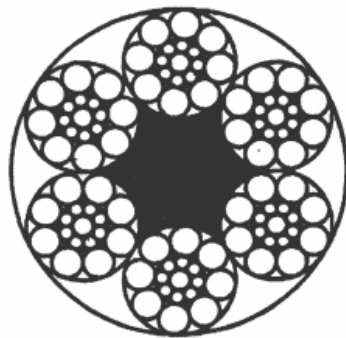
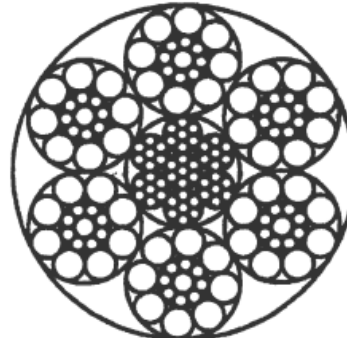
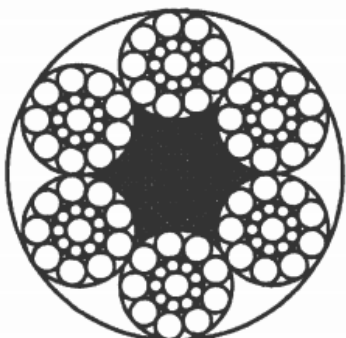
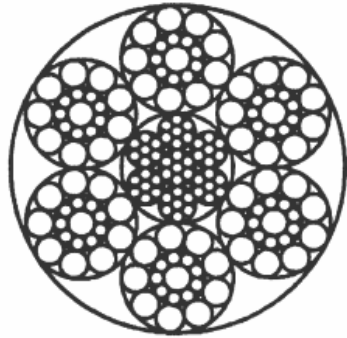
NOTES

1 To calculate the aggregate breaking force, multiply the figures in col 4, 6 and 8 by 1.111 and in col 5, 7 and 9 by 1.193.

2 The nominal diameter 19 mm is non-preferred.

¹⁾ Wire strand core (CWS) may be used for rope diameter 12 mm and below.

Table 2 Breaking Force and Mass for $6 \times 17S$ (8-8-1) and $6 \times 19S$ (9-9-1) Construction Ropes
(Clauses 4, 5 and 6.4)

FIBRE CORE (CF) $6 \times 17S$ (8-8-1)STEEL CORE (CWR) $6 \times 17S$ (8-8-1)FIBRE CORE (CF) $6 \times 19S$ (9-9-1)STEEL CORE (CWR) $6 \times 19S$ (9-9-1)

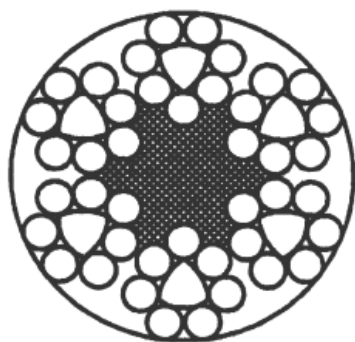
Nominal Diameter mm	Approximate Mass, kg/100m		Minimum Breaking Force Corresponding to Rope Grade, kN					
	Fibre Core (CF)	Steel Core (CWR)	1570		1770		1960	
			Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13	63.0	69.3	88	95	99	107	110	118
14	73.0	80.3	102	110	115	124	127	137
16	95.4	105	133	144	150	162	166	179
18	121	133	168	182	190	205	210	227
19	135	148	188	203	211	228	234	253
20	149	164	208	224	234	253	260	280
22	180	198	252	272	284	306	314	339
24	215	236	299	323	337	364	374	403
25	233	256	325	351	366	395	405	438
26	252	277	351	379	396	428	439	474
28	292	321	407	440	459	496	509	549
32	382	420	532	575	600	648	664	717
36	483	531	673	727	759	820	841	908
38	538	592	750	810	846	913	937	1 012
40	596	656	831	898	937	1 012	1 038	1 121

NOTES

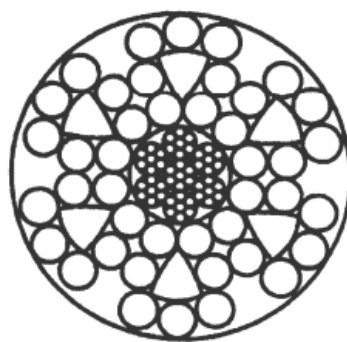
1 To calculate the aggregate breaking force, multiply the figures in col 4, 6 and 8 by 1.163 and in col 5, 7 and 9 by 1.25.

2 The nominal diameter 19 mm is non-preferred.

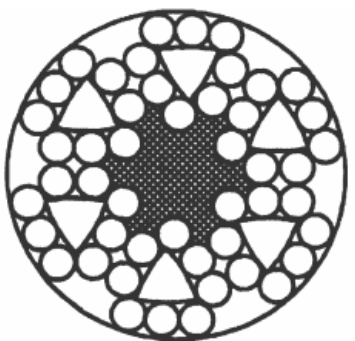
Table 3 Breaking Force and Mass for $6 \times V8$ (7- Δ) and $6 \times V9$ (8- Δ) Construction Ropes
(Clauses 4, 5 and 6.4)



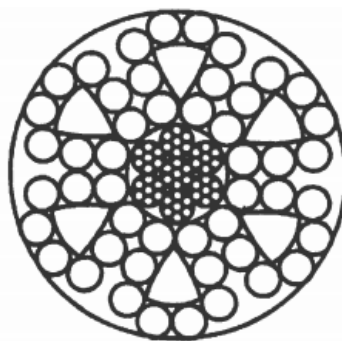
FIBRE CORE (CF) $6 \times V8$ (7- Δ)



STEEL CORE (CWR) $6 \times V8$ (7- Δ)



FIBRE CORE (CF) $6 \times V9$ (8- Δ)



STEEL CORE (CWR) $6 \times V9$ (8- Δ)

Nominal Diameter mm	Approximate Mass, kg/100m		Minimum Breaking Force Corresponding to Rope Grade, kN					
			1570		1770		1960	
	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13	69.3	75.5	96	102	108	115	120	127
14	80.4	87.6	111	118	126	133	139	148
16	105	114	145	154	164	174	182	193
18	133	145	184	195	208	220	230	244
19	148	161	205	218	231	245	256	272
20	164	179	227	241	256	272	284	301
22	198	216	275	292	310	329	343	364
24	236	257	327	347	369	391	409	434
25	256	279	355	377	400	425	443	470
26	277	302	384	408	433	459	480	509
28	321	350	446	473	502	533	556	590
32	420	458	582	617	656	696	727	771
36	531	579	737	781	830	881	920	975

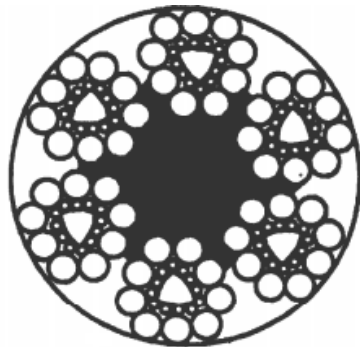
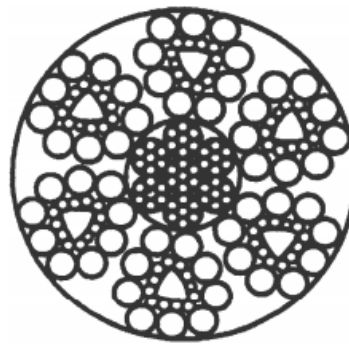
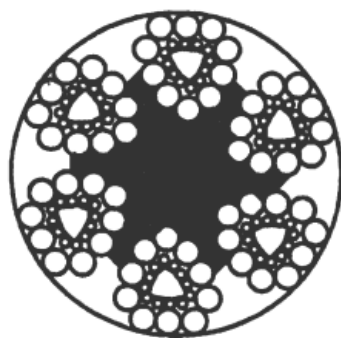
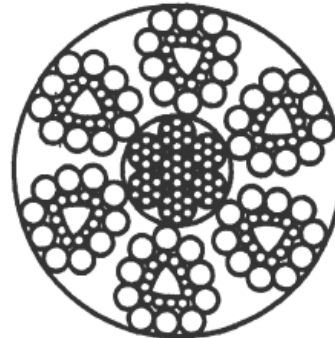
NOTES

1 To calculate the aggregate breaking force, multiply the figures in col 4, 6 and 8 by 1.137 and in col 5, 7 and 9 by 1.21.

2 In case of Δ wire, 3 or more round wires may also be used.

3 The nominal diameter 19 mm is non-preferred.

Table 4 Breaking Force and Mass for $6 \times V22$ (9/12- Δ) and $6 \times V23$ (10/12- Δ) Construction Ropes
(Clauses 4, 5 and 6.4)

FIBRE CORE (CF) $6 \times V22$ (9/12- Δ)STEEL CORE (CWR) $6 \times V22$ (9/12- Δ)FIBRE CORE (CF) $6 \times V23$ (10/12- Δ)STEEL CORE (CWR) $6 \times V23$ (10/12- Δ)

Nominal Diameter mm	Approximate Mass, kg/100m		Minimum Breaking Force Corresponding to Rope Grade, kN					
	Fibre Core (CF)	Steel Core (CWR)	1570		1770		1960	
			Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)	Fibre Core (CF)	Steel Core (CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13	69.3	75.5	93	99	105	111	116	123
14	80.4	87.6	108	114	122	129	135	143
16	105	114	141	150	159	169	176	187
18	133	145	179	189	201	213	223	236
19	148	161	199	211	224	238	248	263
20	164	179	220	234	249	263	275	292
22	198	216	267	283	301	319	333	353
24	236	257	317	336	358	379	396	420
25	256	279	344	365	388	412	430	456
26	277	302	373	395	420	445	465	493
28	321	350	432	458	487	516	539	572
32	420	458	564	598	636	674	704	747
36	531	579	714	757	805	853	892	945
38	592	645	796	843	897	951	993	1 053
40	656	715	882	934	994	1 054	1 101	1 167

NOTES

1 To calculate the aggregate breaking force, multiply the figures in col 4, 6 and 8 by 1.177 and in col 5, 7 and 9 by 1.25.

2 In case of Δ wire 3 or more round wires may also be used.

3 The nominal diameter 19 mm is non-preferred.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Wire Ropes and Wire Products Sectional Committee, MED 10

<i>Organization</i>	<i>Representative(s)</i>
Directorate General of Mines Safety, Dhanbad	SHRI D. B. NAIK (Chairman) SHRI M. ARUMUGAM (<i>Alternate</i>)
Asahi Ropes, New Delhi	SHRI NAKUL GUPTA SHRI MIKESH GUPTA (<i>Alternate</i>)
Bharat Coking Coal Limited, Dhanbad	SHRI P. K. SINHA
Bharat Wire Ropes Limited, Mumbai	SHRI AMOL MOKHADKAR
CSIR-Central Institute for Mining and Fuel Research, Dhanbad	DR MANOJ KUMAR SINGH SHRI DESBASISH BASAK (<i>Alternate</i>)
Directorate General Factory Advice Service and Labour Institutes, Mumbai	SHRI AMIT GOLA B. N. JHA (<i>Alternate</i>)
Directorate General Quality Assurance, New Delhi	COL MANJUNATH B. T.
Directorate General of Aeronautical Quality Assurance, New Delhi	SHRI SANTOSH NAMDEO
Directorate General of Civil Aviation, New Delhi	SHRI HILLOL BISWAS SHRI LALIT GUPTA (<i>Alternate</i>)
Eastern Coalfields Limited, Dishergarh	DR MANAS KUMAR
KIS WIRE ROPE	SHRI SUBHO GHOSH SHRI AJIT VIKRAM SINGH (<i>Alternate</i>)
Maccaferri Environmental Solutions Private Limited, Gurugram	MS MINIMOL KORULLA SHRI RUDRA BUDHBHATTI (<i>Alternate</i>)
Manganese Ore Limited, Nagpur	SHRI ATUL SHARMA SHRI ASHWINI BAGHELE (<i>Alternate I</i>) SHRI S. C. RAI (<i>Alternate II</i>)
Ministry of Shipping, New Delhi	SHRI ANIL PRUTHI SHRI RAMJI SINGH (<i>Alternate</i>)
National Test House, Kolkata	SHRI SURESH PARWAL SHRI ANGAD VERMA (<i>Alternate</i>)
Oil and Natural Gas Corporation Limited, New Delhi	SHRI SUNIL KUMAR TEWARI
Orient Wire Ropes, Indore	DR SAMEER GOLWELKAR
South Eastern Coalfields Limited, Bilaspur	SHRI KAPIL K. RAI SHRI D. BHATTACHARJEE (<i>Alternate</i>)
Tata Steel Limited, Dhanbad	SHRI ABINASH JHA

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<i>Organization</i>	<i>Representative(s)</i>
The Singareni Collieries Company Limited, Kothagudem	SHRI A. GOVINDA RAO
Usha Martin Limited, Ranchi	SHRI SUBRATA DUTTA SHRI SANDEEP JAISWAL (<i>Alternate</i>)
BIS Directorate General	SHRI RAJNEESH KHOSLA SCIENTIST 'E' HEAD (MED) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary

SHRI SANDEEP KESHAV
SCIENTIST 'C' (MED), BIS

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
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